5: Castetter & Bell N-5 (1938-1940) 1942
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of cotton textiles from a Colonial Hohokam site. Also a cotton textile was recovered from the Sacaton Phase in the Snaketown excavations, and cotton seeds and lint were found in other phases[68] (see Chapter III).

That the Pimans were growing a considerable amount of cotton when Kino arrived in Pimería Alta is amply supported. The early Spanish accounts describe the growing of cotton not only by the Gila Pima, but by the Sobaipuri on the San Pedro and at San Xavier.[69] No mention is made of cotton being grown by the desert people (Papago). Kino wrote that natives of Pimería had very good cotton fabrics, and in 1701 noted that the Sobaipuri at San Xavier had given him "many of their good fabrics and blankets of cotton"; and Velarde[70] recorded "The Sobaipuris and other Pimas of the North [evidently along the Gila] sow much cotton, which they weave, and with which they clothe themselves." He also informs us that the dress of those who lived in the north was of cotton cloth, very well woven and painted gracefully with red and yellow. Mange[71] wrote of Sobaipuri Indians at the *ranchería* Santa María de Bugota, as well as those of San Agustín de Oiaur on the Santa Cruz near present day Tucson, dressing themselves with cotton; and of the Sobaipuri Indians at Quíburi on the San Pedro gathering cotton "with which they walk dressed." He also noted that the Sobaipuri inhabitants of Arivavia, also on the San Pedro, gathered "cotton with which they weave premium mantas and painted of various colors, with which they dress and adorn themselves." The *Rudo Ensayo*, evidently written in 1763, in referring to the Gila Pima, records: "So much cotton

[68] Fewkes, *Casa Grande*, pp. 147-48; Jones, *Summary of Data on Aboriginal Cotton*, p. 5; Haury, in Gladwin *et al*, *Excavations at Snaketown*, I, 180-182.

[69] *Documentos*, 3rd ser., IV, 304, 837, 848; Sedelmayr, *Relación*, pp. 106, 108; Bolton: *Anza*, IV, 44; *Kino*, I, 291-92; II, 287; Russell, *Pima*, p. 77; Mange, *Luz*, pp. 248-50, 305; Wyllys, *Velarde's Relación*, p. 129.

[70] Mange, *op. cit.*, p. 305; Wyllys, *op. cit.*, pp. 129, 132.

[71] Mange, *op. cit.*, pp. 247-50, 256.

5: Castetter & Bell N-5 (1938-1940 1942
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is raised and so wanting in covetousness is the husbandman, that after the crop is gathered in, more remains in the fields, than is to be had for a harvest here in Sonora—this upon the authority of a Missionary Father who saw it with his own eyes in the year 1757."[72] Similarly, Font,[73] who visited the Pima along the Gila River while on his journey to Monterrey in 1775-76, wrote that they planted, spun and wove cotton into fabrics, garments and blankets; this was also observed by Garcés. Whittemore[74] stated in 1893 that it was cultivated more than a hundred years before his time. Likewise Oñate's[75] party, which made an expedition to California in 1604-05, observed that Indians along the Gila had cotton mantas, but these were evidently the Maricopa.

Bartlett, Emory and Whipple[76] reported that a considerable amount of native cotton still was being grown and used by the Pima between 1846 and 1850, and in 1873 Grossmann[77] found them still growing small amounts. The Pima have grown cotton commercially for a number of years, and as early as 1864 the Superintendent of Indian Affairs for Arizona stated that he had furnished the Pimas with five hundred pounds of commercial cotton seed.[78]

Russell[79] pointed out forty years ago that from pre-Spanish days down to the last quarter of the nineteenth century the Pima cultivated cotton for the fiber, as well as seeds for food. However, cultivation of the aboriginal product gradually diminished, until by 1901-02 it had so nearly ceased that it was only with difficulty that a sufficient amount of raw cotton of Pima raising was secured to weave a small piece of

[72] *Rudo Ensayo*, p. 128.
[73] Bolton, *Anza*, IV, 44, 49; Coues, *On the Trail*, I, 107-08.
[74] Whittemore, in *Among the Pimas*, p. 52.
[75] Hammond, *Don Juan de Oñate*, p. 167; Bandelier, *Final Report*, I, 110.
[76] Bartlett, *Narrative*, II, 223-29; Emory, *Notes*, pp. 83-5; Whipple, *Official Report*, pp. 598-99.
[77] Grossmann, *The Pima Indians of Arizona*, p. 419.
[78] *Report of the Commissioner of Indian Affairs* for 1863, p. 153.
[79] Russell, *op. cit.*, p. 77.

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cloth. Lloyd[80] found the Pima were no longer growing native cotton in 1903. We have found no trace of Pima or Papago cultivation of aboriginal cotton at the present day; in fact, it was impossible to find a single specimen of the ancient product among these Indians, and it is very doubtful whether any aboriginal cotton has been grown by the Papago-Pima for many years. Early accounts make no specific reference to the growing of cotton by the Papago, yet our informants insisted that within their memory, as well as according to tradition, the Papago grew it in favorable places in their areas with flood-water farming, the fiber for weaving and the seed for food. Moreover Lumholtz,[81] writing of the Papago in 1912, stated that native cotton was still found in use. More commonly, however, they secured their cotton by trade from the Indians of the Altar and Gila valleys.

Lewton,[82] writing in 1912, made mention of a specimen of cotton secured from the Pima at Sacaton by E. W. Hudson, which he considered as belonging to *Gossypium hopi* Lewton. Jones'[83] summary states that T. H. Kearney wrote him that little of the history of this specimen is known, aside from the fact that it was secured from the Pima and the strain has been kept from becoming extinct by making annual plantings at the Field Station at Sacaton. It is evidently seed of this specimen from which annual plantings have been made at the Sacaton Station under the name of "Sacaton Aboriginal," and which was doubtless the kind of cotton cultivated aboriginally by the Pimans. It is a strain of *G. hopi* Lewton, a species found to be very early and genetically quite heterozygous. Genetic experiments, involving interspecific crosses, are reported by Fulton[84] as confirming the evidence from morphological characters that *G. hopi* is more

[80] Lloyd, *Au-au-tam Indian Nights*, p. 58.
[81] Lumholtz, *New Trails*, p. 95.
[82] Lewton, *The Cotton of the Hopi*, p. 8.
[83] Jones, *op. cit.*, p. 4.
[84] Fulton, *Hopi Cotton*, pp. 333, 338; Lewton, *loc. cit.*

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closely related to *G. hirsutum* L. than to *G. barbadense* L. Segregation was found to be much less pronounced in the F_2 from the cross of Hopi with upland cotton (*G. hirsutum*) than from that of Hopi with Egyptian cotton (*G. barbadense*); also there was much less sterility in the F_2 of *hirsutum* x *hopi* than in the F_2 of *barbadense* x *hopi*.

The aboriginal cotton grown by the Papago was undoubtedly the same as that of the Pima, and the indication is that the species was a variety of *G. hopi*. Although the Arizona wild cotton plant, *Thurberia thespesioides*, is found frequently in the southwestern mountain ranges in Arizona,[85] there is little or no evidence that it was ever used by the Pimans as a source of fiber. A single Papago informant, Bernabé López, volunteered the information that it was utilized.

With work done between 1908-16 at the Coöperative Testing Station at Sacaton, the growing of Egyptian cotton in the Salt River Valley became recognized as a practicable industry. In 1912 it was shown that the Yuma variety of Egyptian cotton was suitable for this purpose, and in 1910 the Pima variety had its origin as the selection of a single plant out of a field of Yuma cotton being grown at the station. The Pima variety was not grown commercially until 1916, after the station had demonstrated it was decidedly superior in many respects to the Yuma variety, which it soon completely supplanted. The scarcity of water at a time when the cotton crop is in greatest need of irrigation has prohibited any substantial increase in cotton acreage since 1923, when the Pima crop covered 1,920 acres. The acreage is now confined largely to land regularly supplied with water from pumps in addition to the river flow. It has been ascertained that early plantings of Pima cotton are likely to be much more productive than those made after May 1, in fact the early work of the Field Station indicated that the best time

[85] Bailey, *The Wild Cotton Plant in Arizona*; Hanson, *Distribution of Arizona Wild Cotton*.

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good soil a yield of one thousand pounds of chick peas per acre was not unusual. Pi Pa 244

Pima and Papago planted lentils as early as February, and they were ready to harvest in April or early May. Pima frequently made two plantings of lentils, the Papago but one; this second sowing was after sahuaro harvest. Like chick peas, they were fairly drought resistant. Lentils were harvested and stored in the same manner as teparies, and were reported as returning a yield of tenfold.

Cotton

Time of Harvest

Both Pima and Papago anciently made a single planting of cotton. Among the Pima this was done from late March to mid-April; the Papago planting was made as soon as the summer rains began, usually in July but at times later. Cotton took at least eleven weeks to mature but need not be picked until all other crops were out of the way, usually in late October or early November. Pi Pa ● 248 ●

Method of Harvest and Storage

Anciently it was customary for the Pimans to gather their cotton and pile it in the boll on tops of houses, sheds or *ramadas* for drying. In this connection Emory[18] wrote, under date of November 11, 1846, that "The cotton has been picked, and stacked for drying on the tops of sheds." More recently, in harvesting Pima cotton, two ends of a cotton cloth have been tied over the shoulder, the cloth thus hanging at one side of the body constituting a sort of sack, and in this the bolls were placed as they were picked. They were then taken to the house and spread out on a cloth on the floor in one corner of a room. Only if the season were getting late and frost might kill plants were the stalks removed before bolls matured. Stalks were broken or cut off at ground level then placed on top of the house or a shed and the bolls allowed to

[18] Emory, *Notes*, p. 83.

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ripen before being picked. Of course, at present, with the commercial growing of cotton, Pima pick the cotton from the open bolls directly off the plants in the field.

Cotton seed was stored in sealed ollas in exactly the same manner as were teparies. There was no selection; seed for planting was simply taken from the general supply stored for food.

Utilization of Cotton

Cotton was grown for both lint and seeds. The lint was used for cordage, cloth, garments and tinder. Tinder was prepared from a cotton rope about one-half inch thick, several inches long and frayed at one end, used especially for lighting cigarettes. Sparks made by pounding two pieces of flint together ignited the fiber. Its use as tinder may be a Spanish introduction.

Cotton seed was parched and eaten much like we use pop corn. The seeds were placed in an olla with embers of mesquite wood on top. The olla was continually shaken and the live coals soon parched the seed. Another way of utilizing the seed was in combination with mesquite or cornmeal. Mesquite pods were pounded fine with a wooden mortar and pestle, seeds removed, and the flour mixed with that secured by pounding parched cotton seeds in a mortar. The two were then mixed and molded into a sort of cake-like tortilla, baked in ashes and eaten. A combination of cotton meal and cornmeal was utilized in the same way. Informants said either mixture tasted like, and had the texture of, tallow. From the pounded seeds Papago and Pima made a kind of bread which was baked in hot ashes. At times, water was added to pounded cottonseed meal, strained, and the liquid used as seasoning in cooking. The strained meal residue was sucked in order to remove the nutriment, and the pulp discarded.

Papago informants stated cotton was used ceremonially on their prayer sticks to symbolize clouds, and thereby invite rain. Pimas preferred eagle down for this purpose.

17:Castetter & Underhill N.E-5 (1931-1934) 1935
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Tobacco was planted in March and the planter would choose a place at the mouth of a small wash, out of sight of all the other fields, for tobacco had to be grown in secret. As soon as the plants were up creosote bush branches *(Covillea glutinosa)* were stuck in the ground to shade them. No one but the planter must now visit the patch or the plants would become shy and sink into the earth again. If a menstruating woman were to see them they would shrivel up and die.

No hoeing or transplanting was done but merely earth heaped around the roots now and then. A fence of mesquite posts *(Prosopis veluntina)* with thorny cholla cactus *(Opuntia* sp.) between protected them from marauding animals, and a ditch dug from the wash to the patch conducted any possible rain water. The creosote bush shelter was left until the plants grew up and touched it. When the tobacco was ripe the leaves were pinched off and spread on a mat outside the house to dry, although they were considered ready for smoking when about half dried, still green and very bitter.

COTTON

Cotton, *to'ki (Gossypium* sp.)

The early Spanish accounts refer to cotton as being grown, not only by the Gila Pimas (10), but by the Sobaipuris on the San Pedro (27) and by the people of San Xavier (10) (who were not the present residents). Little mention is made of the growing of cotton by the desert people, but informants thought a little was grown in favored places. No particulars of its culture were obtained. Cottonseed flour made very good browned cakes when baked on hot sand.

WHEAT

Wheat, *pi:rkanyi (Triticum aestivum)*

Wheat seeds were given away profusely by Kino at the end of the seventeenth century. Most Papagos, however, say they did not take over its general use until two or three

241 311 178 farmed is now 3,930 acres. In other words, only 10 per cent of the land formerly used is now being put in crops.

It may be assumed from our survey, and from other evidence, that this situation holds true for the entire reservation. A current estimate of about 1,000 acres in flood water farming is probably fairly accurate.

241 433 178 The reduction in acreage is not surprising. The thing that is difficult to understand is that there should still remain two or three hundred individuals willing to endure the hardships and the failures inherent in flood water farming. In 1914 there were few off-reservation jobs, and fewer Indians willing to leave the reservation in search of work. Farming, however unrewarding, was required to sustain [887] life. This situation is no longer true except for some men, usually the older men, who cannot, or do not, participate in off-reservation wage work.

241 311 [434] [248] Irrigated Farming. During calendar year 1962, Papago Indian farmers grew crops on 740 acres of irrigated land on the main reservation at Chuichu and on 45 acres of irrigated land at San Xavier. Gross income was $94,755, more than half from approximately 120 acres planted in cotton.

241 311 178 Since 1952 the number of acres farmed by Indians at Chuichu increased from 530 to 1,360 (1957) but has now

The rapidity with which the level of ground water in the Casa Grande Valley is being lowered now threatens the life of the entire Chuichu project. During 1962 the one remaining productive well on the west side was choked with silt during an early fall flood on the Santa Cruz, reducing its capacity from 750 to 250 gallons per minute. Since this well had already been drilled to bedrock at 230 feet, and the water level had sunk to within 20 feet of this point, it was decided not to redrill the well. The result will be the abandonment of all farming on the west side and the transfer of Indian holdings (a farming cooperative) to idle land on the east. 241 133 312 311

Even the eastern section, developed after 1955, is threatened with the lowering of the water table at a rate that may cause its abandonment during the next decade.

During 1962 five Indian farmers were growing crops in the eastern section. In addition, the East Chuichu Project (an Indian cooperative) farmed an area of 80 acres of which 40 were planted in cotton. During 1963 the 65-acre cotton allotment on the western side was moved to the eastern section and management of the new land turned over to a non-Indian operator. 248 311 [474]

Development of irrigated agriculture at Gila Bend and at Papago Farms has always depended upon leases to 241 311 427